A Study for the Fulfillment of English IV

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A Scientific Study
For an Alternative Medicine for Dengue Fever

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Dedication

We dedicate this work for our parents who were always there to help and support us.

And to our Almighty God who gave us strength to surpass all this challenges.

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Our adviser Mrs. Jennylyn Jacinto Yray who gave us the chance to make this project.

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And to all people who became part to fulfill this work.

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I. INTRODUCTION

Dengue fever is a disease caused by a family of viruses that are transmitted by mosquitoes. It is an acute illness of sudden onset that usually follows a benign course with symptoms such as headache, fever, exhaustion, severe muscle and joint pain, swollen glands (lymphadenopathy), and rash. The presence (the "dengue triad") of fever, rash, and headache (and other pains) is particularly characteristic of dengue.Other signs of dengue fever include bleeding gums, severe pain behind the eyes, and red palms and soles.

Dengue (pronounced DENG-gay) can affect anyone but tends to be more severe in people with compromised immune systems. Because it is caused by one of four serotypes of virus, it is possible to get dengue fever multiple times. However, an attack of dengue produces immunity for a lifetime to that particular serotype to which the patient was exposed.

Dengue goes by other names, including "breakbone" or "dandy fever." Victims of dengue often have contortions due to the intense joint and muscle pain, hence the name breakbone fever. Slaves in the West Indies who contracted dengue were said to have dandy fever because of their postures and gait.

Dengue hemorrhagic fever is a more severe form of the viral illness. Symptoms include headache, fever, rash, and evidence of hemorrhage in the body. Petechiae (small red or purple splotches or blisters under the skin), bleeding in the nose or gums, black stools, or easy bruising are all possible signs of hemorrhage. This form of dengue fever can be life-threatening and can progress to the most severe form of the illness, dengue shock syndrome.

A. HISTORY

The first reported epidemics of dengue fever occurred in 1779-1780 in Asia, Africa, and North America; the near simultaneous occurrence of outbreaks on three continents indicates that these viruses and their mosquito vector have had a worldwide distribution in the tropics for more than 200 years. During most of this time, dengue fever was considered a benign, nonfatal disease of visitors to the tropics. Generally, there were long intervals (10-40 years) between major epidemics, mainly because the viruses and their mosquito vector could only be transported between population centers by sailing vessels.

A global pandemic of dengue began in Southeast Asia after World War II and has intensified during the last 15 years. Epidemics caused by multiple serotypes (hyperendemicity) are more frequent, the geographic distribution of dengue viruses and their mosquito vectors has expanded, and DHF has emerged in the Pacific region and the Americas. In Southeast Asia, epidemic DHF first appeared in the 1950s, but by 1975 it had become a leading cause of hospitalization and death among children in many countries in that region.

In the 1980s, DHF began a second expansion into Asia when Sri Lanka, India, and the Maldive Islands had their first major DHF epidemics; Pakistan first reported an epidemic of dengue fever in 1994. The recent epidemics in Sri Lanka and India were associated with multiple dengue virus serotypes, but DEN-3 was predominant and was genetically distinct from DEN-3 viruses previously isolated from infected persons in those countries. After an absence of 35 years, epidemic dengue fever occurred in both Taiwan and the People's Republic of China in the 1980s. The People's Republic of China had a series of epidemics caused by all four serotypes, and its first major epidemic of DHF, caused by DEN-2, was reported on Hainan Island in 1985. Singapore also had a resurgence of dengue/DHF from 1990 to 1994 after a successful control program had prevented significant transmission for over 20 years. In other countries of Asia

where DHF is endemic, the epidemics have become progressively larger in the last 15 years.

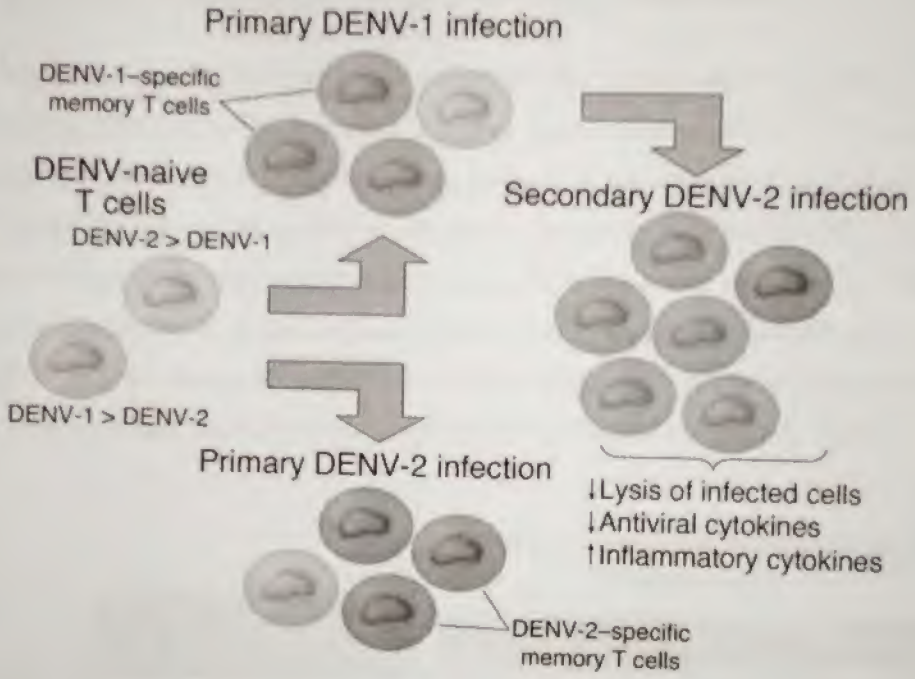
In the Pacific, dengue viruses were reintroduced in the early 1970s after an absence of more than 25 years. Epidemic activity caused by all four serotypes has intensified in recent years with major epidemics of DHF on several islands.

Despite poor surveillance for dengue in Africa, epidemic dengue fever caused by all four serotypes has increased dramatically since 1980. Most activity has occurred in East Africa, and major epidemics were reported for the first time in the Seychelles (1977), Kenya (1982, DEN-2), Mozambique (1985, DEN-3), Djibouti (1991-92, DEN-2), Somalia (1982, 1993, DEN-2), and Saudi Arabia (1994, DEN-2). Epidemic DHF has been reported in neither Africa nor the Middle East, but sporadic cases clinically compatible with DHF have been reported from Mozambique, Djibouti, and Saudi Arabia.

The emergence of dengue/DHF as a major public health problem has been most dramatic in the American region. In an effort to prevent urban yellow fever, which is also transmitted by *Ae. aegypti*, the Pan American Health Organization organized a campaign that eradicated *Ae. aegypti* from most Central and South American countries in the 1950s and 1960s. As a result, epidemic dengue occurred only sporadically in some Caribbean islands during this period. The *Ae. aegypti* eradication program, which was officially discontinued in the United States in 1970, gradually eroded elsewhere, and this species began to reinfest countries from which it had been eradicated. In 1997, the geographic distribution of *Ae. aegypti* is wider than its distribution before the eradication program with more than one-third of the world's population living in areas at risk for transmission, dengue infection is a leading cause of illness and death in the tropics and subtropics. As many as 100 million people are infected yearly. Dengue is caused by any one of four related viruses transmitted by mosquitoes. There are not yet any vaccines to prevent infection with dengue virus (DENV) and the most effective protective measures are those that avoid

mosquito bites. When infected, early recognition and prompt supportive treatment can substantially lower the risk of developing severe disease.

Dengue has emerged as a worldwide problem only since the 1950s. Although dengue rarely occurs in the continental United States, it is endemic in Puerto Rico, and in many popular tourist destinations in Latin America and Southeast Asia; periodic outbreaks occur in Samoa and Guam.

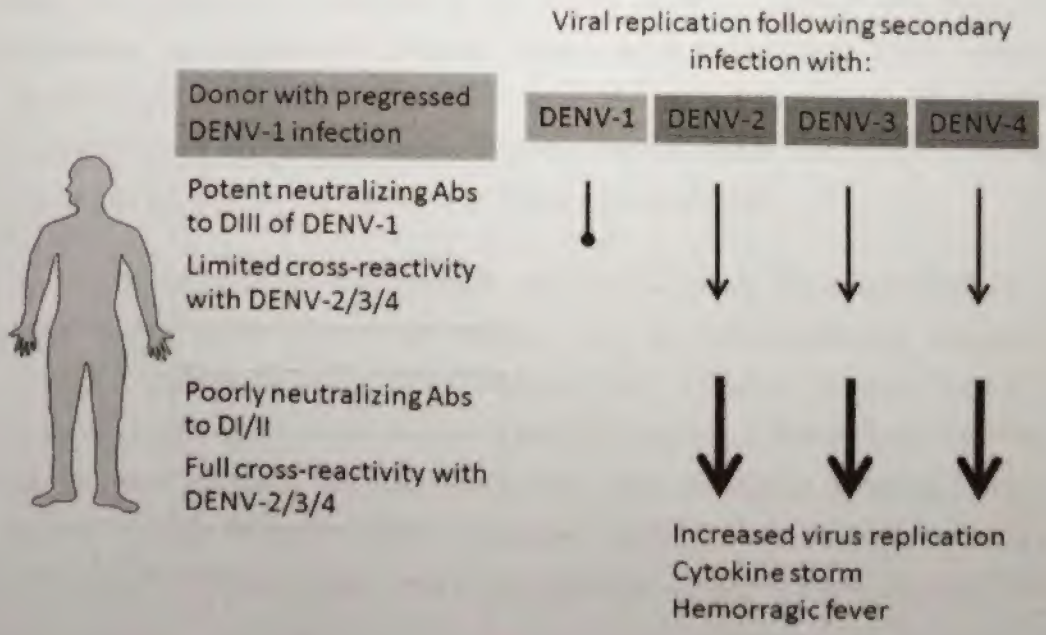


In 1970, only DEN-2 virus was present in the Americas, although DEN-3 may have had a focal distribution in Colombia and Puerto Rico. In 1977, DEN-1 was introduced and caused major epidemics throughout the region over a 16-year period. DEN-4 was introduced in 1981 and caused similar widespread epidemics. Also in 1981, a new strain of DEN-2 from Southeast Asia caused the first major DHF epidemic in the Americas (Cuba). This strain has spread rapidly throughout the region and has caused outbreaks of DHF in Venezuela, Colombia, Brazil, French Guiana, Suriname, and Puerto Rico. By 1997, 18

countries in the American region had reported confirmed DHF cases and DHF is now endemic in many of these countries.

DEN-3 virus recently reappeared in the Americas after an absence of 16 years. This serotype was first detected in association with a 1994 dengue/DHF epidemic in Nicaragua. Almost simultaneously, DEN-3 was confirmed in Panama and, in early 1995, in Costa Rica. In Nicaragua, considerable numbers of DHF cases were associated with the epidemic, which was apparently caused by DEN-3. In Panama and Costa Rica, the cases were classic dengue fever.

Viral envelope gene sequence data from the DEN-3 strains isolated from Panama and Nicaragua have shown that this new American DEN-3 virus strain was likely a recent introduction from Asia since it is genetically distinct from the DEN-3 strain found previously in the Americas, but is identical to the DEN-3 virus serotype that caused major DHF epidemics in Sri Lanka and India in the 1980s. As suggested by the finding of a new DEN-3 strain, and the susceptibility of the population in the American tropics to it DEN-3 spread rapidly throughout the region caused major epidemics of dengue/DHF in Central America in 1995.



In 1997, dengue is the most important mosquito-borne viral disease affecting humans; its global distribution is comparable to that of malaria, and an estimated 2.5 billion people live in areas at risk for epidemic transmission. Each year, tens of millions of cases of dengue fever occur and, depending on the year, up to hundreds of thousands of cases of DHF. The case-fatality rate of DHF in most countries is about 5%; most fatal cases are among children and young adults.

There is a small, but significant, risk for dengue outbreaks in the continental United States. Two competent mosquito vectors, *Ae. aegypti* and *Aedes albopictus*, are present and, under certain circumstances, each could transmit dengue viruses. This type of transmission has been detected three in the last 16 years in south Texas (1980, 1986, and 1995) and has been associated with dengue epidemics in northern Mexico. Moreover, numerous viruses are introduced annually by travelers returning from tropical areas where dengue viruses are endemic. From 1977 to 1994, a total of 2,248 suspected cases of imported dengue were reported in the United States. Although some specimens collected were not adequate for laboratory diagnosis, 481(21%) cases were confirmed as dengue. Many more cases probably go unreported each year because surveillance in the United States is passive and relies on physicians to recognize the disease, inquire about the patient's travel history, obtain proper diagnostic samples, and report the case. These data suggest that southern Texas and the southeastern United States, where *Ae. aegypti* is found, are at risk for dengue transmission and sporadic outbreaks.

The reasons for this dramatic global emergence of dengue/DHF as a major public health problem are complex and not well understood. However, several important factors can be identified. First, effective mosquito control is virtually nonexistent in most dengue-endemic countries. Considerable emphasis for the past 20 years has been placed on ultra-low-volume insecticide space sprays for adult mosquito control, a relatively ineffective approach for controlling *Ae. aegypti*. Second, major global demographic changes have occurred, the

most important of which have been uncontrolled urbanization and concurrent population growth. These demographic changes have resulted in substandard housing and inadequate water, sewer, and waste management systems, all of which increase *Ae. aegypti* population densities and facilitate transmission of *Ae. aegypti*-borne disease. Third, increased travel by airplane provides the ideal mechanism for transporting dengue viruses between population centers of the tropics, resulting in a constant exchange of dengue viruses and other pathogens. Lastly, in most countries the public health infrastructure has deteriorated. Limited financial and human resources and competing priorities have resulted in a "crisis mentality" with emphasis on implementing so-called emergency control methods in response to epidemics rather than on developing programs to prevent epidemic transmission. This approach has been particularly detrimental to dengue control because, in most countries, surveillance is (just as in the U.S.) very inadequate; the system to detect increased transmission normally relies on reports by local physicians who often do not consider dengue in their differential diagnoses. As a result, an epidemic has often reached or passed transmission before it is detected.

B. SOURCE OF INFECTION

The yellow fever mosquito, *Aedes aegypti* is a mosquito that can spread the dengue fever, Chikungunya and yellow fever viruses, and other diseases. The mosquito is a small, dark mosquito of approximately 4 to 7 millimeters with typical white markings on the legs and a marking of the form of a lyre on the thorax. Females are larger than males, and can be distinguished by small palps tipped with silver or white scales.

Aedes Aegypti

Aedes aegypti is a day biting mosquito. That means that the mosquito is most active during daylight, for approximately two hours after sunrise and several hours before sunset. The mosquito rests indoors, in closets and other dark places. Outside, they rest where it is cool and shaded. The males of all species of mosquitoes do not bite humans or animals of any species, they live on fruit. The female of *Aedes aegypti* feed not only on fruit, but also on blood. When viewed under a microscope, male mouthparts are modified for nectar feeding, and female mouthparts are modified for blood feeding (see figure 2). The female needs blood to mature her eggs. Feeding on humans generally occurs at one to two hour intervals. The mosquito attacks generally from below or behind, usually

from underneath desks or chairs and mainly at the feet and ankles. *Aedes aegypti* is adapted to breed around human dwellings and prefers to lay its eggs in clean water which contains no other living species. These eggs become adult in about one-and-a-half to two weeks (see also Life cycle of *Aedes aegypti*).

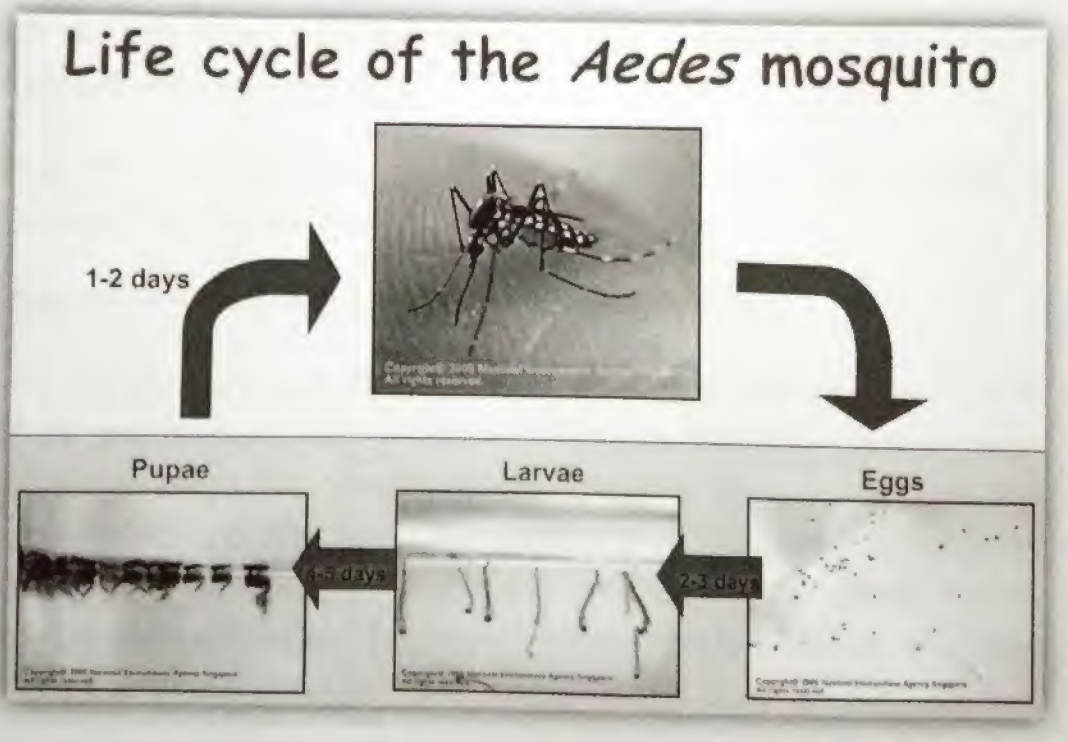
In dengue virus infected mosquito's, the virus is present in the salivary glands of the mosquito. When a female *Aedes aegypti* bites a human for food, she injects saliva into the wound where the anti-coagulants contained in her saliva facilitate feeding. Without knowing, the mosquito also injects the dengue virus into the host. Since the virus can be passed from adult to egg, the dengue virus is guaranteed to survive until the next summer and heavy rains.

Aedes Albopictus

The mosquito originated from Africa, but is now present globally in tropical and sub-tropical regions (see also Epidemiology). The mosquito has a so-called cosmo-tropical distribution annually, and spreads to more temperate regions during the summer. Living near man *Aedes aegypti* has become largely dependent on and adapted to humans. For instance, the mosquito has greatly reduced the 'humming' sound it makes with their wings. Humans nearly hear *Aedes aegypti*, unlike other species whose humming is extremely irritating and awakens the deepest sleeper. The insect is very fast in flight unless gorged

with blood. Other types of mosquito even fly into your face and can be easily caught or killed, not *Aedes aegypti*.

In South America, *Aedes aegypti* distribution extended from the southern United States down to Argentina in the 19th century. The mosquito was nearly eradicated due to the development of a successful eradication program as a method to control yellow fever through mosquito control and manipulation of breeding sites. Though initially successful, *Aedes aegypti* has re-established in most parts of South America due to lack of commitment and financial backing necessary to maintain the eradication program (see figure 3). The program is no longer operational today. In the United States, the mosquito is found in at least 23 states, including the southeastern U.S., up the east coast to New York, and west to Indiana and Kentucky.



C. STAGES OF DENGUE FEVER

The majority (more than 90%) of Dengue fever infections pass without complaints or like a common cold. The remaining 10% of patients display the symptoms of classical Dengue fever. Incubation time, i.e. the time until complaints commence, is three to 14 days in the case of Dengue fever. The course of disease can be divided into three stages:

Stage I: Sudden outbreak of disease with high fever, which declines after one or two days. The fever is accompanied by strong headaches, lassitude, dizziness, severe feeling of illness, muscle pains, joint pains and rheumatic pains. Typically, there may be a metallic or bitter taste in the mouth.

Stage II: After the fever has declined temperature rises again. This is also called a "biphasic course of disease". A blotchy

skin rash with itching palms and feet may appear. Sometimes the lymph nodes may swell within the whole body.

Stage III: The complaints abate after five or six days. The subsequent convalescence may last several weeks.

Stage IV: Shock and death (10% of all cases reach this stage)

In 2% of the cases Dengue fever takes a life-threatening course with severe complications such as Dengue-hemorrhagic-fever (DHF) and Dengue-shock-syndrome (DSS). Mortality ranges from six to 30% in this case. The symptoms are a severely impaired general condition with high fever, bleedings into the skin (petechiae), the mucous membranes, and internal organs, enlargement of the liver and declining blood pressure. There are high-risk groups particularly susceptible to DHF/DSS:

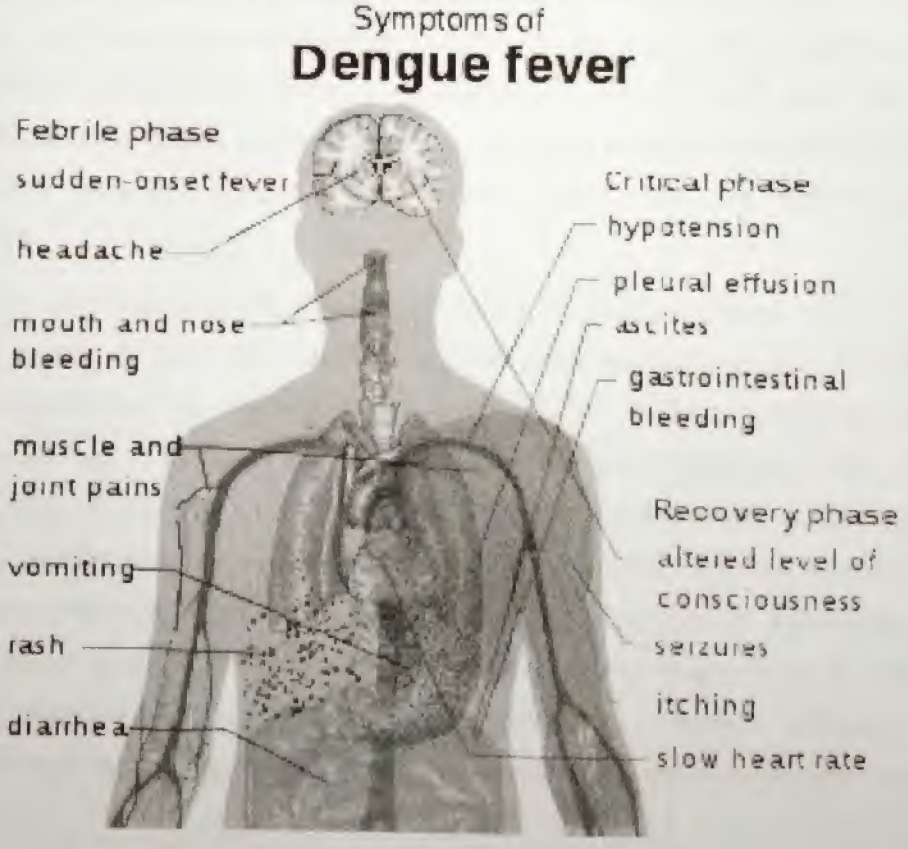
• Sex: Women suffer from complications more often than men

• Race: Caucasians and Asians are frequently afflicted by DHF/DSS, Blacks rarely

• Age: Children of less than 15 years of age are especially vulnerable

D. SIGN AND SYMPTOMS

Typically, people infected with dengue virus are asymptomatic (80%) or only have mild symptoms such as an uncomplicated fever. Others have more severe illness (5%), and in a small proportion it is life-threatening. The incubation period (time between exposure and onset of symptoms) ranges from 3–14 days, but most often it is 4–7 days. Therefore, travelers returning from endemic areas are unlikely to have dengue if fever or other symptoms start more than 14 days



after arriving home. Children often experience symptoms similar to those of the common cold and gastroenteritis (vomiting and diarrhea), but are more susceptible to the severe complications.

The characteristic symptoms of dengue are sudden-onset fever, headache (typically located behind the eyes), muscle and joint pains, and a rash. The alternative name for dengue, "break-bone fever", comes from the associated muscle and joint pains. The course of infection is divided into three phases: febrile, critical, and recovery.

The febrile phase involves high fever, often over 40 °C (104 °F), and is associated with generalized pain and a headache; this usually lasts two to seven days. At this stage, a rash occurs in approximately 50–80% of those with symptoms. It occurs in the first or second day of symptoms as flushed skin, or later in the course of illness (days 4–7), as a measles-likerash. Some petechiae (small red spots that do not disappear when the skin is pressed, which are caused by brokencapillaries) can appear at this point, as may some mild bleeding from the mucous membranes of the mouth and nose. The fever itself is classically biphasic in nature, breaking and then returning for one or two days, although there is wide variation in how often this pattern actually happens.

In some people, the disease proceeds to a critical phase, which follows the resolution of the high fever and typically lasts one to two days. During this phase there may be significant fluid accumulation in the chest and abdominal cavity due to increased capillary permeability and leakage. This leads to depletion of fluid from the circulation and decreased blood supply to vital organs. During this phase, organ dysfunction and severe bleeding, typically from the gastrointestinal tract, may occur. Shock (dengue shock syndrome) and hemorrhage (dengue hemorrhagic fever) occur in less than 5% of all cases of dengue, however those who have previously been infected with other serotypes of dengue virus ("secondary infection") are at an increased risk.

The recovery phase occurs next, with resorption of the leaked fluid into the bloodstream. This usually lasts two to three days. The improvement is often striking, but there may be severe itching and a slow heart rate. During this stage, a fluid overload state may occur; if it affects the brain, it may cause a reduced level of consciousness or seizures.

Classic dengue fever is characterized by

Fever:

- Sudden and abrupt onset
- May go up to 39.5-41.4°C
- Lasts for about 1-7 days, then fades away for 1-2 days
- It soon recurs with secondary rashes which is usually not as severe as before

Headaches:

Fever is usually accompanied by headache in front portion of head or behind the eyes

Muscular (Myalgia) or bone pain:

- Occurs after onset of fever
- Affects legs, joints, and lumbar spine
- Usually the pain gets severe after its onset
- The pain may last for several weeks even after the fever has subsided
- Pain is usually absent in DHF/DSS

Other symptoms:

- Nausea and vomiting
- Loss of appetite

- Increased sensation to touch
- Change in taste sensation

Symptoms maybe milder in children than in adults

The acute phase of illness can last for 1 week followed by a 1 to 2 week period of recovery period that is characterized by weakness, malaise and loss of appetite.

Rash - red and white patchy rashes:

The illness is clinically indistinguishable from Influenza, Measles or Rubella.

Dengue Hemorrhagic Fever / Dengue Shock Syndrome

Initial stages of the disease resembles symptoms of dengue fever. However fever subsidies after 2 to 7 days followed by signs and symptoms of

- Restlessness
- Signs of circulatory failure
- Bleeding or hemorrhagic manifestations including:
- Skin bleeds that appear as blotchy red patches called - Petechiae
- Bleeding from Nose or Epistaxis
- Bleeding from gums
- Bleeding from Stomach - appearing as blood in the vomit
- Decrease in the blood platelet count (Thrombocytopenia)

Leakage of plasma from vascular compartment leading to increased blood concentration and manifestations of shock.

These symptoms when not treated may lead to Dengue Shock Syndrome, which

when not treated immediately may lead to profound shock and eventually death.

Warning signs of Dengue Shock Syndrome are

- Severe abdominal pain,
- Vomiting,
- Change in temperature,
- Mental irritability.

E. SIGNIFICANCE

In recent decades there has been a global resurgence of epidemic DF and DHF. Many factors are responsible for this widespread increase in dengue activity, however, it is clear that rapid population growth, urbanization and increased international air travel have all been driving forces associated with the explosive increase in dengue incidence. Rapid population growth and poorly planned urbanization has lead to substandard housing, inadequate water supply and waste management systems. Consequently, storage of drinking water and other urban water sources (e.g. old types, litter) provides habitat for mosquito larvae. *Aedes aegypti*, the principal dengue vector, is adapted to these domestic environments and its distribution in urban areas has expanded. Increased air travel has facilitated the spread of dengue strains and serotypes between regions, increasing the prevalence of hyperendemicity and the risk of DHF.

Classic dengue fever is a severe, flu-like illness that affects infants, young children and adults, but seldom causes death. The clinical features of dengue fever range from non-existent or mild to severe and vary according to the age of the patient. Infants and young children may have a fever with rash. Older children and adults may have either a mild fever or the classical incapacitating disease with abrupt onset and high fever, severe headache, pain behind the eyes, muscle and joint pains, and a rash.

In crertain circumstances, the disease may progress to dengue hemorrhagic fever or dengue shock syndrome, both of which can be fatal. These syndromes are rare in UK travelers. There has been evidence to suggest that a subsequent infection with a dengue virus of a different serotype may be the cause of these two syndromes and they are more common in regions where there are frequent dengue outbreaks, with different serotypes of the virus circulating.

II. RELATED STUDY

The chance of contracting DF is determined by several factors including travel destination, length of exposure in endemic areas, the intensity of dengue transmission, and the season of travel. Risk irs thought to be higher during periods of intense mosquito feeding activity two to three hours after dawn and during the early evening).

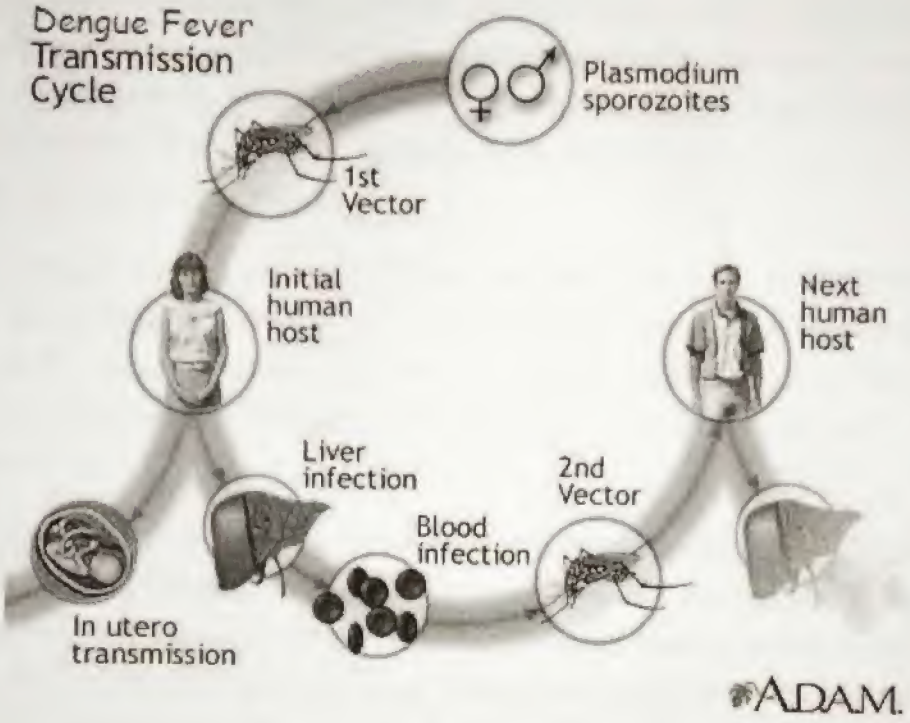
All travelers to tropical countries where dengue is endemic are at risk of infection, although determining the actual level of risk is difficult. Several studies have demonstrated that travelers who spend a long period in endemic areas (such as expatriates or aid workers) are at increased risk; however, even short-term visitors may be exposed to dengue. The Geo Sentinel global network of travel and tropical medicine clinics reported on illness in returned travelers, and determined that the regions at highest risk for dengue were SE Asia and the Caribbean. The true incidence of dengue fever in travelers is probably underestimated because in many countries reporting is not obligatory and, due to its non-specific symptoms, it is probably under-diagnosed.

Transmission occurs following a bite from an infected *Aedes*mosquito. It is most widely transmitted by *Ae. Aegypti* and *Ae. Albopictus* (Asia, Philippines and Japan), other *Aedes* species also transmit disease in specific areas; *Ae. Polynesiensis*, *Ae. Scutellaris* and *Ae. Pseudoscutallaris* (Pacific Islands and New Guinea), Ae. Polynesiensis (Society Islands) and *Ae. Niveus* (Philippines). The cycle of transmission typically involves humans and mosquitoes.

The virus is spread from an infected human to a mosquito and then to another human, often in areas where there are dense human populations. In parts of SE Asia and Africa, the transmission cycle may also involve jungle primates that act as a reservoir for the virus.

The *Aedes* mosquito prefers to breed in water-filled receptacles, usually close to human habitation. They often rest in dark rooms (e.g. in bathrooms and

under beds) and breed in small pools that collect in discarded human waste [3]. Although they are most active during daylight hours, biting from dawn to dusk, mosquitoes will feed throughout the day indoors and during overcast weather. The mosquito becomes infectious 8-10 days after feeding and remains infectious for life (2-3 months).



The disease can be classified into five presentations; non-specific febrile illness, classic dengue, dengue hemorrhagic fever, dengue hemorrhagic fever with dengue shock syndrome, and other unusual syndromes such as encephalopathy and fulminant liver damage. Clinical features vary with the age of the patient. Studies from populations where dengue is endemic suggest that between 14% and 87% of cases are asymptomatic or sub-clinical.

The incubation period is 5 to 8 days. In non-immune persons, dengue begins with a fever lasting 1 to 5 days.

Young children with dengue often have an undifferentiated febrile illness with a maculopapular rash, which typically spreads from the trunk to include the limbs and face and which occurs between days 3 and 5 of the illness. Upper respiratory tract infections are common. Most infections in children are asymptomatic or minimally symptomatic.

Classic dengue is more common amongst older children, adolescents, and adults. It has an abrupt onset with a high fever which is often accompanied by a severe headache, myalgia, arthralgia, nausea, and vomiting. Most infections are self-limiting with improvement in symptoms and rapid recovery occurring 3 to 4 days after the onset of the rash.

Dengue hemorrhagic fever (DHF) is primarily a disease of children under 15 years in hyper endemic areas. It is characterized by increased capillary permeability and haemostatic changes e.g. bleeding under the skin (purpura), from the gums and gastrointestinal tract. Mortality can be as high as 10-20% if left untreated.

DHF with shock is accompanied by respiratory and/or renal failure. Mortality, if left untreated, can be 40%. Survival rates are significantly higher if the patient is treated in hospital by experienced staff, leading to low mortality rates of 1% to 2%. It is not certain what precipitates progression, although it has been suggested that previous infections with a different serotype of the virus predisposes to DHF when a person becomes re-infected. This form of dengue is rarely seen in travelers.

Rare presentations of infection include severe hemorrhage, jaundice, parotitis, and cardiomyopathy. Neurological symptoms can include encephalitis, polyneuropathies and transverse myelitis. Guillain-Barré syndrome has also been reported.

Lifelong immunity to the infecting virus serotype occurs in those who recover, however, infection with one serotype does not confer immunity to the other three serotypes or to other flaviviruses.

A. PREVENTION AND CONTROL

At this point, there is no vaccination against Dengue fever. Thus the only prophylaxis available consists of avoiding mosquito bites. As global mosquito control measures have deteriorated individual prophylaxis gains in importance.

This means:

- Wearing bright clothing covering legs and arms all day long
- Applying mosquito nets to bed and windows
- Use of air conditioning
- Avoiding or eliminating mosquito breeding places
- Not spending time outdoors, particularly not in gardens, green areas and poor neighbourhoods
- Applying mosquito repellents at all times

B. ALTERNATIVE MEDICINE

There is no vaccine or drug to prevent dengue fever. The only way to prevent dengue fever is to avoid mosquito bites. The *Aedes* mosquito bites during the day particularly around dawn and dusk (as opposed to mosquitoes that transmit malaria, which bite at night between dusk and dawn). A good repellent containing N, N-diethylmetatoluamide (DEET) must be used on exposed skin together with light cover-up clothing. If sunscreen is also being used, repellent must be applied after sunscreen. In endemic areas, dengue control programs rely on the elimination of mosquito breeding sites in the community by regular inspections and insecticide spraying of properties

(particularly during an outbreak) and the education of local residents to regularly empty standing water and keep outside areas free from waste items in which water may collect.

There is no specific antiviral treatment for either classic dengue or DHF. Supportive nursing care and careful management of fever, fluid balance, electrolytes, and clotting parameters are the standard treatment.

For typical dengue, the treatment is purely concerned with relief of the symptoms (symptomatic). Rest and fluid intake for adequate hydration is important. Aspirin and nonsteroidal anti-inflammatory drugs should only be taken under a doctor's supervision because of the possibility of worsening hemorrhagic complications. Acetaminophen (Tylenol) andcodeinemay be given for severe headache and for the joint and muscle pain (myalgia).

However since the Philippines is abundant with herbal medicines, there are plants being touted as an alternative cure to dengue fever. The following plants are called the tawa-tawa (scientific name: euphoria hirta), sweet potato tops or camote tops (scientific name: Ipomoea batatas) and papaya leaves (scientific name: carica papaya caricaceae).

1. TAWA-TAWA PLANT

The tawa-tawa plant is described as having numerous flowers which measures about 5 to 8 centimeters each with sepals and petals that are obovate-oblong, yellowish-green and covered with large, reddish-brown blotches. This particular weed has been attested to by dengue survivors to cure dengue fever and is being actively advocated by herbalists as treatment for dengue even though the Department of Health does not endorse it because extensive research on the weed has not been undertaken.

The Philippines has two seasons, the dry season which is from December to May and then the wet season which comes around June until November. The

wet season in the Philippines also brings with it various diseases ranging from the common colds, to influenza and other diseases involving the respiratory system like bronchitis or bronco-pneumonia. And then there is also the almost perennial dreaded disease called Dengue. Just recently, this disease has hogged the news and the Philippines' Department of Health (DOH) has even considered announcing an "outbreak" of the said disease.

Dengue is a disease caused by a family of viruses that are transmitted by mosquitoes. This said virus can be contracted from the bite of a striped mosquito known as Aedes aegypti mosquito. The disease can be spread by the dengue carrier mosquitoes or by the mosquito having previously bitten an infected person thereby creating the person-to-mosquito-to-another-person pathway of spreading the said disease. Although the spread of the disease is alarming, this particular disease is not contagious and cannot be spread directly from one person to another.

The common symptoms of dengue include the presence of the "dengue triad" characterized by fever, rash and headache. Other signs of dengue include

bleeding gums, severe pain behind the eyes and red palms and soles. Dengue causes hemorrhaging of the internal organs which may lead to death of the patient.

Tawa-tawa does not fight dengue virus. Instead, it only promotes the development of blood platelets and softens the effect of the dengue virus. Tawa-tawa has natural enzymes within that stabilize the membranes of the blood vessels, preventing internal bleeding. There is a study that it increases platelet count in mouse/rat but there is no human study that it also increases human's platelets and no study to back up the claim that tawa-tawa has natural enzymes within that stabilize the membranes of the blood vessels and preventing internal bleeding. You must remember that in dengue there is normal platelet count, what is abnormal is the function, also the permeability of the capillary blood vessels causing bleeding.

There is no study how long when you start drinking "tawa-tawa" to how high the platelets will rise. If ever it would work. You are better off with platelet transfusion. Do not start unproven or even dangerous so called treatment. Better not delay to consult your doctor. A few hours delay could be fatal.

Since the dengue fever is caused by a virus, there is no specific medicine or antibiotic to treat it. For typical dengue, the immediate concern is the relief of symptoms. Adequate fluid intake for proper body hydration and lots of rest is very important. All else will depend on the person's immune system.

Despite this unenthusiastic response from the DOH, there are still a lot of people who are willing to try the tawa-tawa in tea form to cure dengue fever. The effect of the tawa-tawa plant in the body is that it enables the body to produce more platelets which are essential for blood clotting or anti-bleeding. Within twenty-four hours of one cup hourly intake of the tawa-tawa tea, the dengue fever will be cured.

In making the tawa-tawa tea, take 5 to 6 whole tawa-tawa plants, cut off the roots and then wash and clean. Add water then let boil for about a minute. Let cool and then you have your tawa-tawa tea. Let the dengue patient drink one cup of this concoction every hour for 24 hours. Within this period, the patient will feel much better.

2. CAMOTE TOPS

Dengue fever is one of the dreaded diseases that has plagued so many children and adults alike. When dengue strikes, the platelet count of the victim plunges down to a dangerous and critical level that becomes fatal. Research shows that the nutritional content of camote tops or sweet potato greens can counter attack the downfall of the platelet count of anyone hit by dengue fever camote tops or sweet potato greens are always available in the market any time of the year. It is easily grown and does not require special maintenance or fertilizers to grow. The root crops are edible and are good substitute to rice.

The word "kamote" occurs in various Philippine dialects. It is a variant of the Spanish word "camote" and refers to the sweet potato. Sweet potatoes have nutritious roots, but Filipinos also use the tips of their long, twining vines in soups and salads. Kamote tops occur mainly in two colors: green and purple.

In Philippine folk medicine, crushed kamote tops serve as a poultice to treat acne and boils. Kamote tops are also ingested as a folk remedy in the treatment of diabetes and dengue.

Researchers, such as Dr. F. Garcia, have examined the medicinal value of kamote tops, including a study of their efficacy in the treatment of dengue and diabetes.

Green and purple kamote tops are rich in polyphenols. Polyphenols are antioxidants, substances which counteract chemicals in the human body that damage such important components as cell membranes and DNA.

The sweet potato is one of the world's most cultivated crops, and is grown all over the world, but especially in Asia and the Pacific. The leaves are good forage for domestic animals, so consumption by humans is looked down upon in some places as the food of the poor. However, because some varieties of leaves are high in protein, they can serve an important place in a diet that is based on tubers and other grains. Chinese herbalist lore says that the leaves can improve the respiratory and renal system function.

Like spinach, chard and other greens, sweet potatoes leaves are highly versatile. Cooking with Asian Leaves has two recipes: sweet potato leaves in a coconut milk sauce, and stir-fried sweet potato leaves. Since it was still close to

my Eat Local month, I used the second one as my inspiration. I found the leaves to be quite tasty: tender, a nicely balanced flavor, not even a hint of bitterness, and none of that strange astringency that greens like spinach and chard possess.

3. PAPAYA LEAVES

Papaya Leaf is an herbaceous tree with a stem of spongy, soft wood that is hollow in the center and bears melon-like fruit. It is an interesting tree, in that the male and female parts exist in different trees, and trees may grow to a height of twenty to thirty feet. The Papaya Tree needs a tropical climate that is dry when cold and wet when warm; consequently, its greatest success appears in the equatorial zone with its warm wet season and cool dry season.

It is extremely sensitive to frost, and water-logging will kill the taproot within forty-eight hours. The Papaya is especially susceptible to Parasites, pests and diseases. This fussy plant needs a lot of water but must have good drainage, and it bears most fruit in light, porous, slightly acidic soils that are rich in organic matter. Said to be a native of the Caribbean and Central America, the Papaya is the true papaw that now grows abundantly throughout tropical America, Hawaii and many other tropical climates throughout the world.

Although grown to some extent in South Florida, the true papaw is not related to the North American papaw. The fruits, leaves and latex are all used medicinally. The fruit is usually pear-sized and has a central cavity filled with edible, pea-sized seed, which are said to have a similar flavor as capers. Papaya Leaves are cooked and considered a green vegetable and are a rich source of gummy, milky, white latex that contains the powerful enzyme, papain. This protein-dissolving substance is an excellent remedy for stomach and digestive disorders.

Papain is so powerful that Papaya Leaves have been wrapped around meats to break down the fibers and tenderize them. It is included in commercial preparations as a meat tenderizer and often used for that purpose in restaurants, and it also used commercially in chewing gums and as a stabilizing agent that is used to clarify beer. Papaya Leaves were even fed to animals to tenderize their flesh. Some of Papaya Leaf's constituents include the fermenting agent myrosin, alkaloids, rutin, resin, tannins, carpaine, dehydrocarpaines, pseudocarpaine, flavonols, benzylglucosinolate, linalool, malic Acid, methyl salicylate, another enzyme, chymopapain (latex and exudates), calcium, iron, magnesium, manganese, phosphorus, potassium, Zinc, beta-carotene, B-vitamins and vitamins A, C and E. Papaya Leaf is an excellent treatment for digestive disorders and extremely useful for any disturbances of the gastrointestinal tract. Papain, the powerful enzyme in Papaya, helps to dissolve and digest protein, thus easing stomach ailments and indigestion. (Because papain breaks down tough meat fibers, it is often used in restaurants and is the major ingredient in commercial meat tenderizers!) Papaya has been effective in easing heartburn and is given to treat dyspepsia and gastric catarrh. Papaya also stimulates the appetite.

Papaya Leaf's enzyme, papain, not only digests protein, but it extends its activity to digesting carbohydrate. Papain also breaks down wheat gluten, which may be helpful for those suffering from Celiac disease; and those who have

difficulty digesting starchy foods, such as breads, cereals and potatoes, might find great relief in including Papaya in their diets.

The papain in Papaya is thought to relieve acute prostate inflammation and may be very helpful in cases of benign prostatic hypertrophy (BPH). Clinical studies in Russia found that papain treatment reversed rectal lesions induced by extreme prostate enlargement in over 97 percent of the men treated.

The papain in Papaya is currently undergoing studies to investigate its efficacy in treating the Herpes simplex virus and Herpes zoster (shingles).

Another papaya enzyme, chymopapain, has been used in the treatment of slipped spinal disc and pinched nerves.

Since many stomach problems are the direct result of indigestion, use of Papaya appears to help prevent many ailments. It stimulates digestive acids and the production of bile, which may also lead to a healthier liver and pancreas.

Papaya is said to stimulate the bowels in times of constipation and is also believed to be useful in treating inflammatory bowel disorders. In many areas of the world, Papaya is used as a vermifuge, anthelmintic and amoebacide that eliminate worms and other Parasites, and it is thought that the papain content digests the invaders, and Papaya's latex also works as a dewormer by its purgative actions, increasing the movement of intestinal contents.

"From a platelet count of 45 (normal: 150-440), by drinking papaya juice the platelet back to normal.

III. METHODS AND PROCEDURE

Here are the procedures of the three alternative medicines for Dengue Fever.

A. TAWA - TAWA TEA

- Take 5 to 6 full whole Tawa - Tawa plants.

- Cut off the roots, throw it away, it is not included in the tea.

- Wash and clean

- Fill your boiling pot with clean water.

- Boil the Tawa Tawa for 1 (one) minute in a slow rolling boil.

- Pour the tawa tawa water and let cool.

- Let the dengue fever victim drink the tawa-tawa tea for 24 hours.

- Sip 1 to 1.5 glasses of tawa tawa water every 1 hour

The internal hemorrhaging will stop and the dengue fever will be cured after 24 hours.

B. CAMOTE TOPS JUICE

- Buy your Camote tops bunch

- Remove the leaves one by one.

- Do not include the tip most tiny leaves as they taste too bitter, or your healer may wish to include those for another purpose.

- Wash the leaves.

- Pound with a little water.

- Strain the juice out, no fiber needed.

- Add some filtered water.

- Drink up. Wait 10 minutes before ingesting anything else.

- 1 bunch makes 2 cups.

C. PAPAYA LEAVES JUICE

- Take fresh, mature leaves from a papaya tree. Leaves from the "Red Lady" papaya (papaw) variety are more effective.

- Wash the leaves with clean water then tear the leaf into pieces.

- Crush the leaves in a pestle, without water or salt.

- Squeeze the crushed leaves to extract the juice

- Serve the juice for the victim. A two large leaf can make two spoon full of table spoon.

C. TRANSMISSION

1. THE VIRUS

Dengue virus (DEN) is a small single-stranded RNA virus comprising four distinct serotypes (DEN-1 to -4). These closely related serotypes of the dengue virus belong to the genus Flavivirus, family Flaviviridae. The mature particle of the dengue virus is spherical with a diameter of 50nm containing multiple copies of the three structural proteins, a host-derived membrane bilayer and a single copy of a positive-sense, single-stranded RNA genome. The genome is cleaved by host and viral proteases in three structural proteins (capsid, C, prM, the precursor of membrane, M, protein and envelope, E) and seven nonstructural proteins (NS).Distinct genotypes or lineages (viruses highly related in nucleotide sequence) have been identified within each serotype, highlighting the extensive

genetic variability of the dengue serotypes. Purifying selection appears to be a dominant theme in dengue viral evolution, however, such that only viruses that are "fit" for both human and vector are maintained. Among them, "Asian" genotypes of DEN-2 and DEN-3 are frequently associated with severe disease accompanying secondary dengue infections (43–45). Intra-host viral diversity (quasispecies) has also been described in human hosts.

2. TRANSMISSION OF THE DENGUE VIRUS

Humans are the main amplifying host of the virus. Dengue virus circulating in the blood of viraemic humans is ingested by female mosquitoes during feeding. The virus then infects the mosquito mid-gut and subsequently spreads systemically over a period of 8--12 days. After this extrinsic incubation period, the virus can be transmitted to other humans during subsequent probing or feeding. The extrinsic incubation period is influenced in part by environmental conditions, especially ambient temperature. Thereafter the mosquito remains infective for the rest of its life. Ae. aegypti is one of the most efficient vectors for arboviruses because it is highly anthropophilic, frequently bites several times before completing oogenesis, and thrives in close proximity to humans. Vertical transmission (transovarial transmission) of dengue virus has been demonstrated in the laboratory but rarely in the field. The significance of vertical transmission for maintenance of the virus is not well understood. Sylvatic dengue strains in some parts of Africa and Asia may also lead to human infection, causing mild illness. Several factors can influence the dynamics of virus transmission -- including environmental and climate factors, hostpathogen interactions and population immunological factors. Climate directly influences the biology of the vectors and thereby their abundance and distribution; it is consequently an important determinant of vector-borne disease epidemics.

9. What food should you eat if you have dengue fever?
   a. Fruits
   b. Vegetables
   c. Meat
   d. None
   e. All

10. What are common mosquito breeding sites to watch for?
   a. Outdoor Canals
   b. Unused cans or bottles
   c. Hollow tree stumps
   d. Overflow trays under the house
   e. None
   f. All

5. What are the symptoms of the dengue fever?
    a. Headache
    b. Prolonged fever
    c. Rashes
    d. None
    e. All
6. What is the best indoor protective measure to avoid dengue fever?
    a. Wear shoes, socks, long – pants and long – sleeved shirts
    b. Using mosquito repellents
    c. Mosquito nets
    d. Mosquito coils
    e. None
    f. All
7. What is the treatment for dengue fever?
    a. Medicines
    b. Alternative medicines
    c. Both
    d. None
8. Is it good to take those alternative medicines rather than to take the generic medicines?
    a. Yes
    b. No
    c. Both

IV. METHODOLOGY

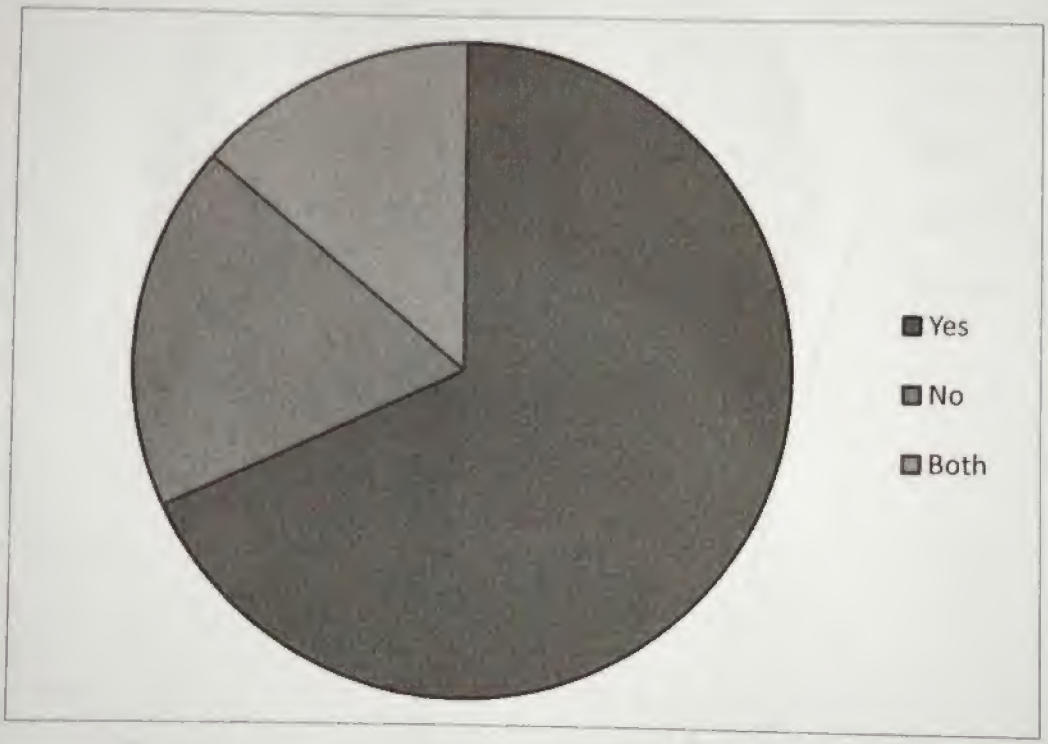
1. Are you aware of dengue fever?
    a. Yes
    b. No
    c. Both
2. Do you think dengue fever is one of the major outbreak disease?
    a. Yes
    b. No
    c. Both
3. Who is the common dengue fever victim?
    a. Babies
    b. Childrens
    c. Adults
    d. None
    e. All
4. Dengue fever came from what?
    a. Food
    b. Water
    c. Insect bite
    d. None
    e. All

V. RESULTS AND GRAPHS

1. Are you aware of dengue fever?

   H^1 = They are aware of dengue fever.

   H^2 = They are not aware of dengue fever.



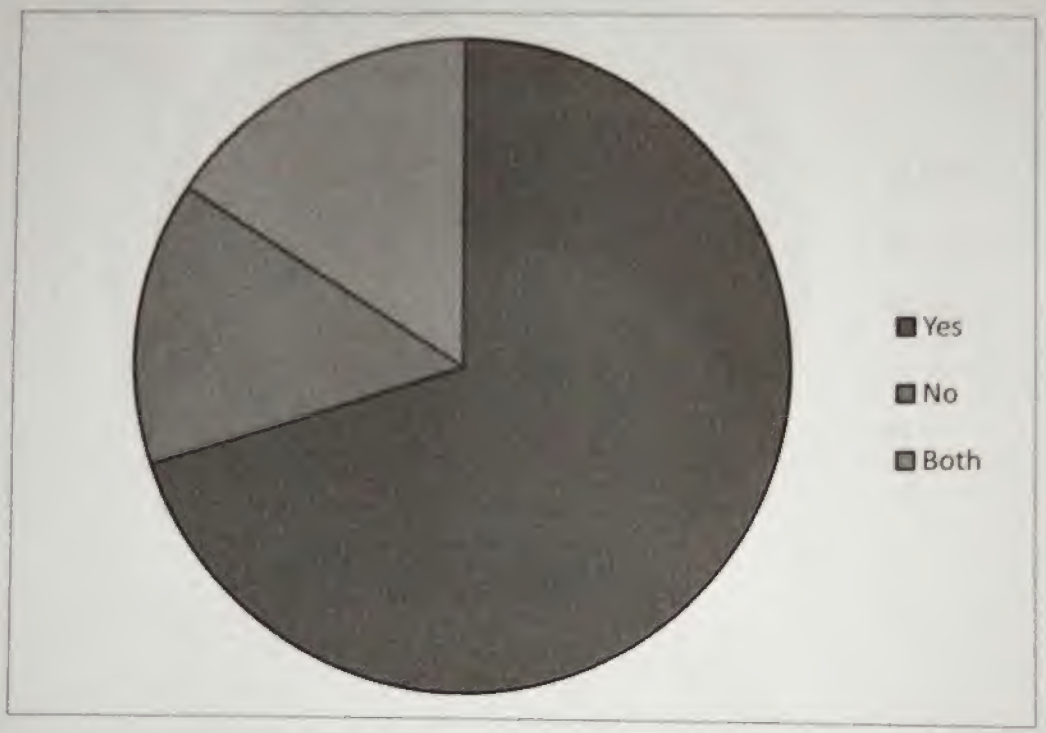
Result:

The graph shows that 68% of the respondence answered Yes, 18% answered No and 14% answered Both.

2. Do you think dengue fever is one of the major outbreak diseases?

H^1 = Dengue Fever is one of the major outbreak diseases.

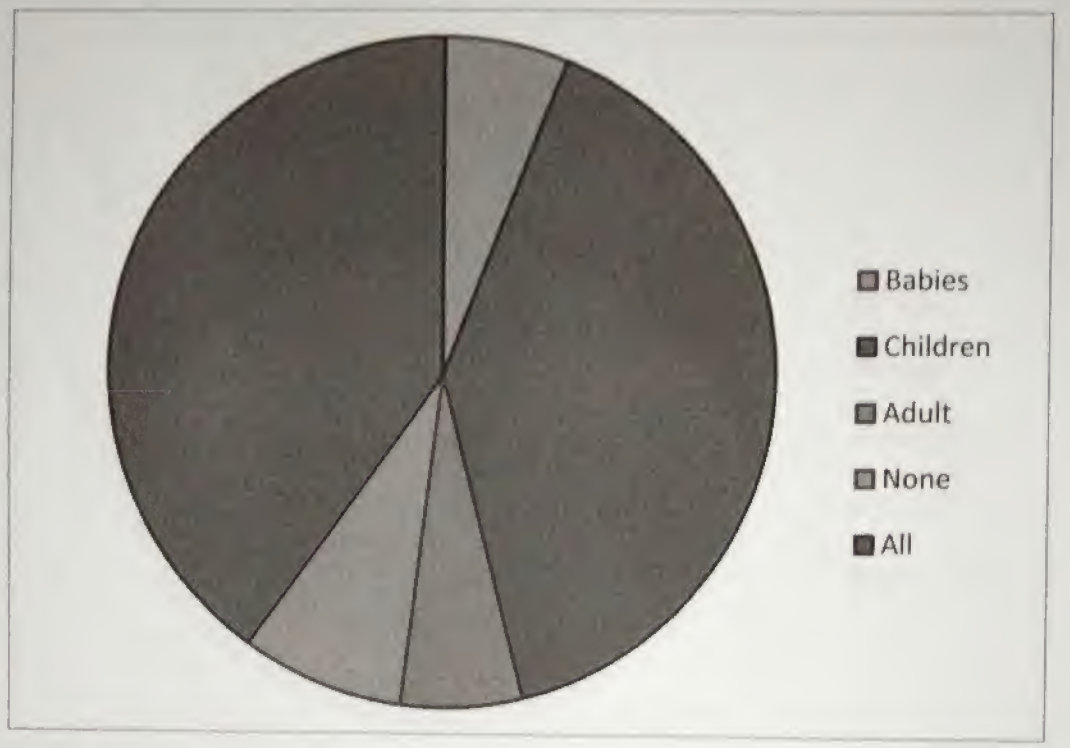
H^2 = Dengue Fever isn't one of the major outbreak diseases.



Result:

The graph shows that 70% of the respondence answered Yes, 14% answered No and 16% answered Both.

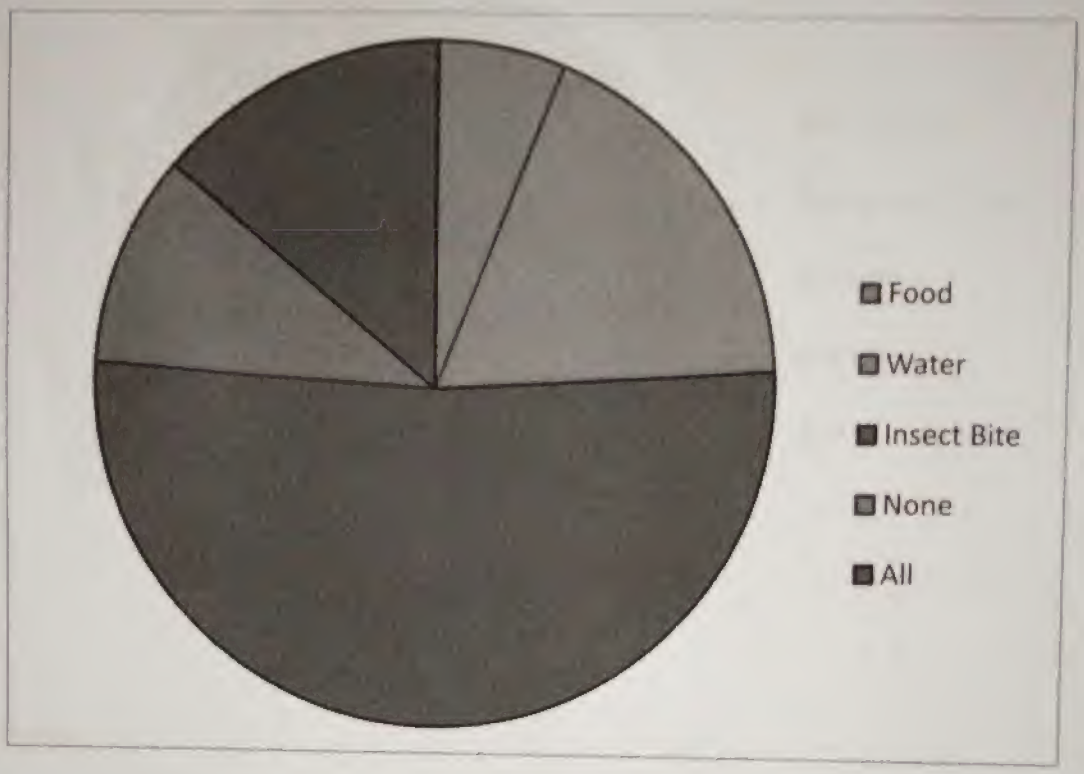
3. Who is the common dengue victim?



Result:

The graph shows that 6% of the respondence answered Babies, 40% answered Children, 6% answered Adults, 8% answered None and 40% answered All.

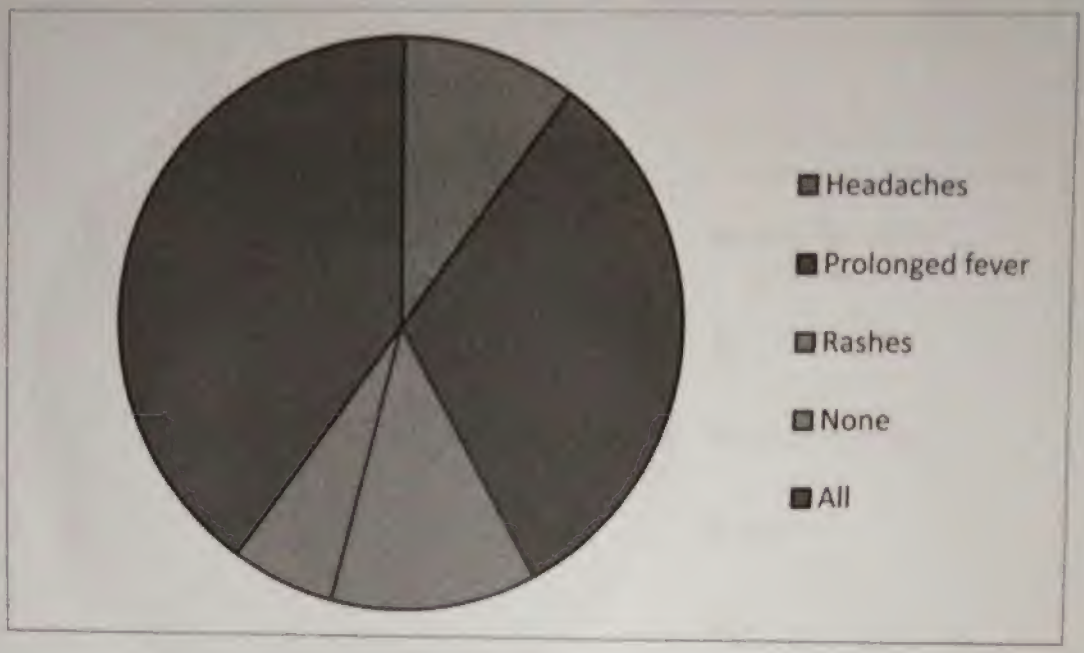
4. Dengue fever came from what?



Result:

The graph shows that 6% of the respondence answered Food, 18% answered Water, 52% answered Insect Bite, 10% answered None and 14% answered All.

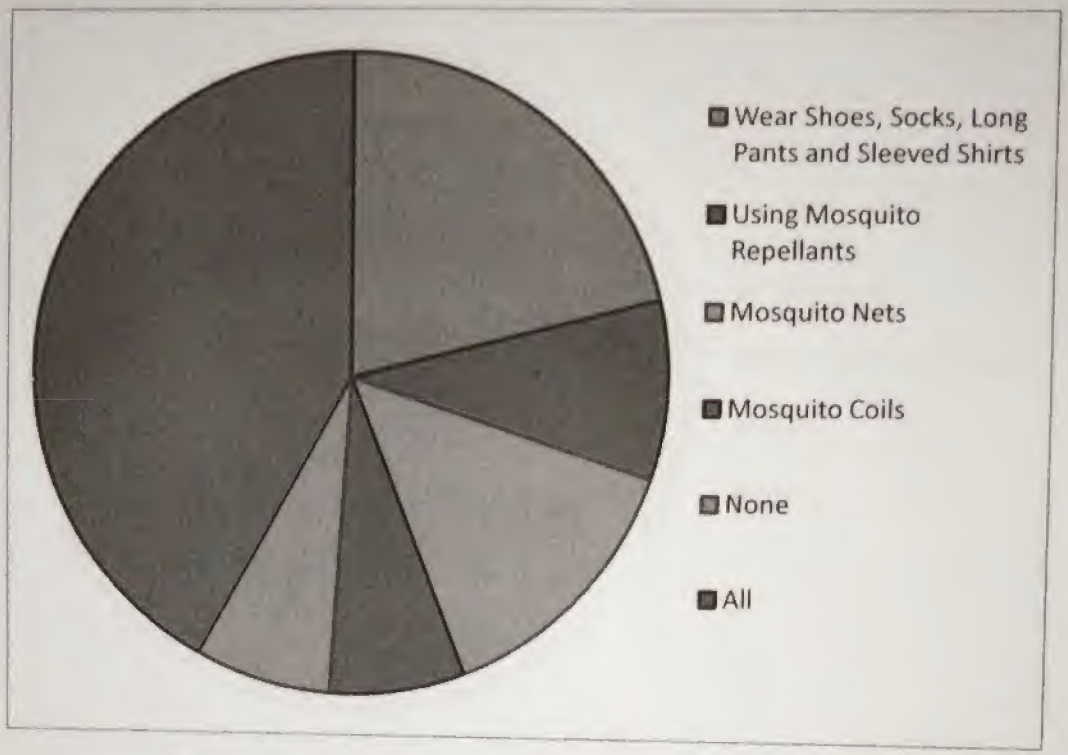
5. What are the common symptoms of the dengue fever?



Result:

The graph shows that 10% of the respondence answered Headaches, 32% answered Prolonged Fever

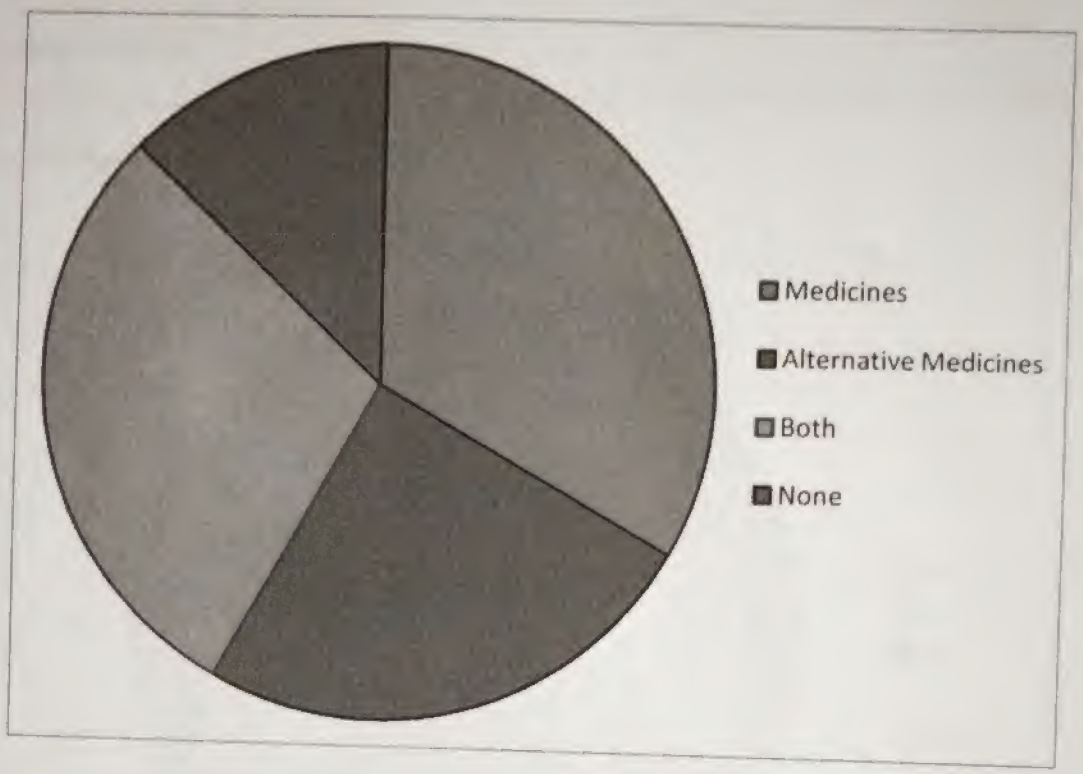
6. What is the best indoor protective measure to avoid dengue fever?



Result:

The graph shows that 21% of the respondence answered Wear Shoes, Socks, Long Pants and Sleeved Shirts, 9% answered Using Mosquito Repellants, 14% answered Mosquito Nets, 7% answered Coils, 7% answered None and 42% answered All.

7. What is the treatment for dengue fever?



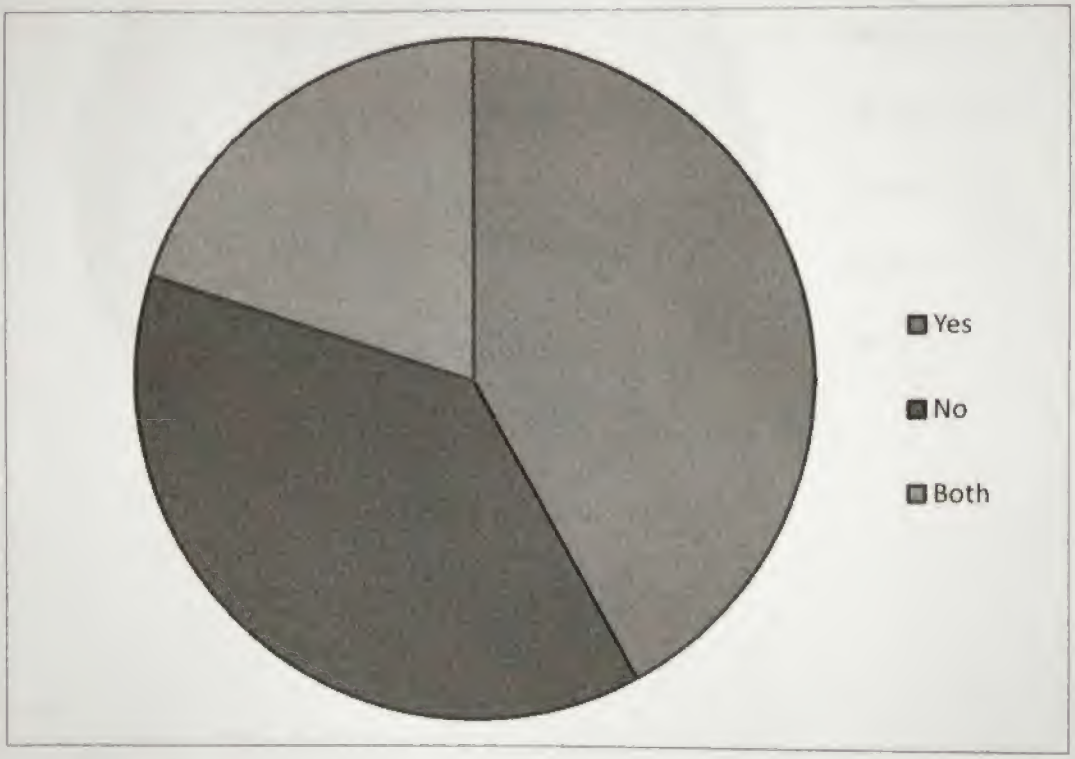
Result:

The graph shows that 33% of the respondence answered Medicines, 25% answered Alternative Medicines, 29% answered Both and 13% answered None.

8. Is it good to take home those alternative medicines rather than to take the generic medicines?

H^1 = It is good to take home those alternative medicines rather than to take the generic medicines.

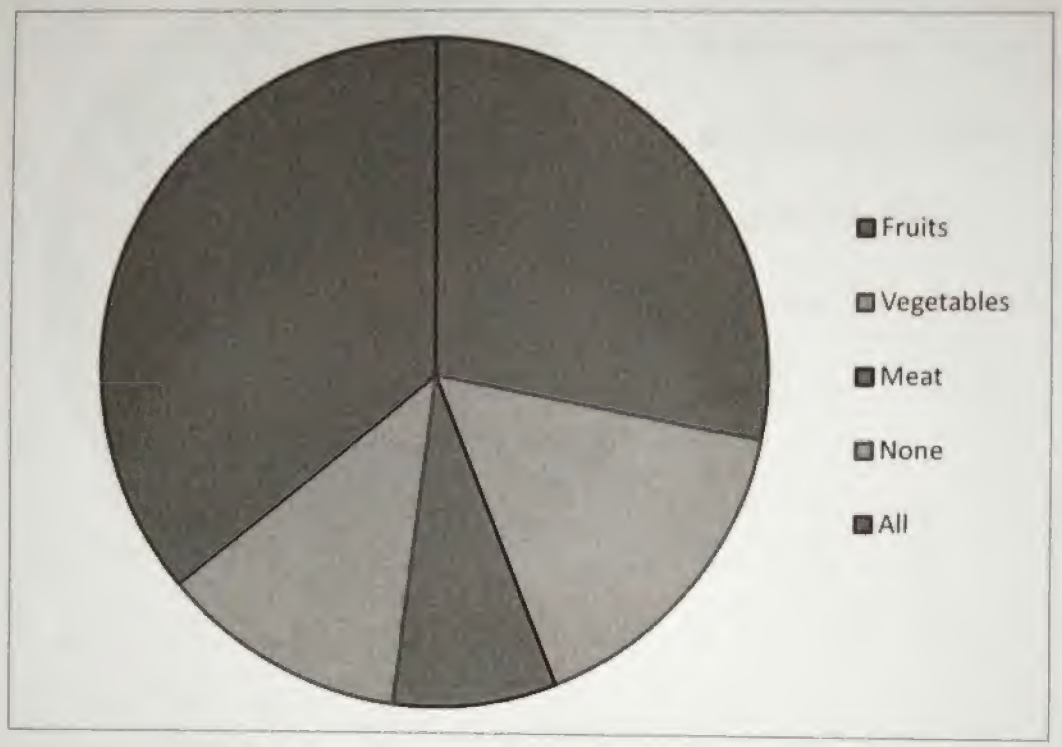
H^2 = It is not good to take home those alternative medicines rather than to take the generic medicines.



Result:

The graph shows that 43% of the respondence answered Yes, 38% answered No and 20% answered Both.

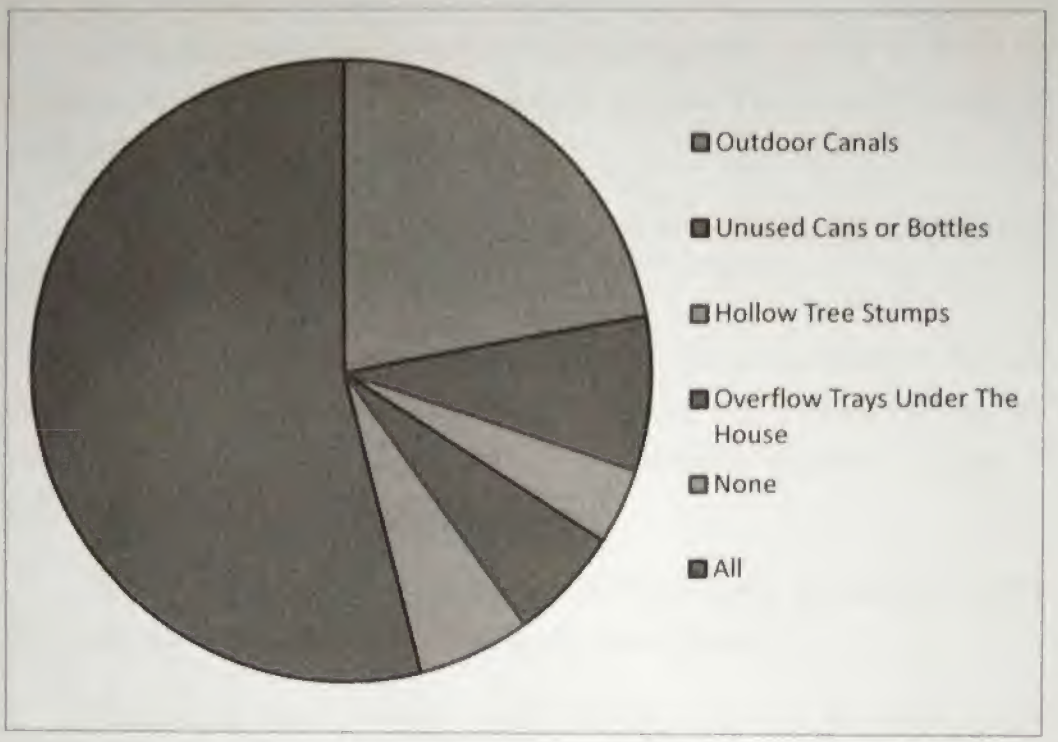
9. What food should you eat if you have dengue fever?



Result:

The graph shows that 28% of the respondence answered Fruits, 16% answered Vegetables, 8% answered Meat, 12% answered None and 36% answered All.

10. What are the common mosquito breeding sites to watch for?



Result:

The graph shows that 22% of the respondence answered Outdoor Canals, 8% answered Unused Cans or Bottles, 4% answered Hollow Tree Stumps, 6% answered Overflows Trays Under the House, 6% answered None and 54% answered All.

VI. CONCLUSION

Different outbreak diseases are now experienced globally, and one of these is the Dengue Fever. Everyone knows what this fever is, but some of them have knowledge on where it came from and are its symptoms.

There is no vaccine or direct medicine invented for this disease yet except for pain relievers and Anti-bacterial medicine.

Dengue virus is currently a problem in global infection. Diagnoses via new molecular-based techniques have become a new hope for early diagnosis, but are still limited due to their costs and standardization. The possibility of treatment of dengue via antiviral drugs is still under investigation.

Since this disease needed long medication due to rapidly spreading of bacteria that could lead to life threatening, we need to save dengue victims.

Because the body's immunity system thus can be revived, this makes dengue helpless against the body's natural defenses. We created an alternative herbal medicine made from lowly camote tops or sweet tomato greens, papaya leaves and tawa-tawa weeds. Now, People no longer need to die needlessly from dengue, because the cure is just all around us that can save lives.

VII. RECOMMENDATION

We all knew that a mosquito carry dengue fever, a disease that can cause life threatening if we don't cure it immediately. It can rapidly spread and needs long medication.

Mosquitoes population are now rapidly increasing because of our carelessness in our surrounding and now, numbers of dengue victim are now also rapidly increasing.

Doctors and professionals have made a lot of searches and investigations in finding a cure for this disease but none of them are successful. This made us to create an alternative medicine that can help for this problem in curing this disease.

We recommend that we should be responsible in cleaning our surroundings to decrease that population of mosquitoes carrying dengue fever as well as decreasing the victim and death rate of dengue fever.

And because of expensive medication, we advise everyone to learn to use alternative medicines found in our surroundings that is always abundant and available that could be a big help in curing victims until a cure is found.

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